

# Evaluation of preparedness for medical emergencies at dental offices: A survey

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## Abstract

**Background:** The best way to handle an emergency is to be prepared in advance. The purpose of this study was to assess the availability of medical emergency drugs at dental offices and to determine the level of knowledge and preparedness of dentists to manage medical emergencies at their dental offices. **Materials and Methods:** A descriptive cross-sectional study was conducted from January to June 2014 with 250 dental graduates to determine their knowledge and ability in the management of medical emergencies and assess availability of emergency drugs and equipments in dental offices in the Ahmedabad and Udaipur areas of India. The questionnaire consisted of mainly objective questions, requiring a simple yes or no reply. Mann-Whitney test was used for the analysis. A 95% confidence level was used and a *P* value of less than or equal to 0.05 was considered statistically significant. **Results:** The results of our study showed that almost all the surveyed dentists (98%) enquired about medical history, but only 12% obtained filled health history proforma from patients regarding the above. Only 38.4% participants recorded the vital signs of patients before commencing any treatment. Also, 7.6% reported about having attended any workshops on emergency training or management programs. Emergency kits were available with only 24% participants and the available kits were assessed for the availability of emergency drugs. Also, 34% were confident about giving intramuscular injection and only 6.6% were sure about giving intravenous injections. The *P* value was found to be highly statistically significant. **Conclusion:** The results of our study reflect an alarming situation about the capability of dentists to deal with such conditions.

**Key words:** *Emergency drugs, medical emergencies, survey*

## INTRODUCTION

As the quality of health care is improving and life expectancy is increasing, dentists and dental students are required to treat a growing number of elderly and medically compromised patients. Studies have found that half of all patients treated in a dental school have

at least one chronic disease or condition. Since some diseases and their treatments increase the likelihood of a medical emergency during dental care, dentists must be prepared to manage a variety of medical emergencies.<sup>[1]</sup>

These emergencies in a dental clinic can be alarming to any clinician, but these situations become relatively less alarming with adequate precautions and necessary training. Serious medical emergencies are not common in dental practice, but a dentist must be equipped to handle such events.<sup>[2]</sup>

Dealing with medical emergencies is not as difficult as most dentists expect. There is far less to know, for example, than what we have already learned and use in our every day practice.

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Some emergencies end in disaster even in hospitals where there is optimal management, for example, someone may have a heart attack while being treated in the dental office. Even though these tragic events happen through no fault of one's own, dentists just need to be prepared and know what to do to give the patient the best chance of recovery.<sup>[3]</sup>

The purpose of this study was to assess the availability of medical emergency drugs at dental offices and to determine the level of knowledge and preparedness of dentists to manage medical emergencies at their dental offices.

## MATERIALS AND METHODS

A descriptive cross-sectional study was conducted from January to June 2014 with 250 dental graduates to determine their knowledge and ability in the management of medical emergencies and assess availability of emergency drugs and equipments in dental offices in the Ahmedabad and Udaipur areas of India. The study area comprised around 600–700 dental clinics. Ethical clearance was taken from the institution ethical committee before the commencement of the study. The questionnaire consisted mainly of objective questions, requiring a simple yes or no reply [Tables 1 and 2], and informed consent was taken from all the study participants. A pilot study was conducted on 25 dental clinics that were selected randomly; based on their doubts related to the questions, the questionnaire was modified. Reliability of the questionnaire was determined by using Cronbach's alpha coefficient test, which gave a value of 0.72. Data obtained were entered into a computer and analyzed using Statistical Package for Social Science (SPSS) Version-16 data analysis software. Mann–Whitney test was used for the analysis. A 95% confidence level was used and a *P* value of less than or equal to 0.05 was considered statistically significant.

## RESULTS

The results of our study showed that almost all the surveyed dentists (98%; *P* = 0.001) enquired about medical history including medication and allergy, but only 12% (*P*-0.001) of the participants provided and obtained filled health history proforma from patients regarding the above. Only about one-third of the participants (38.4%; *P*-0.001) recorded vital signs (blood pressure, pulse, respiration, temperature) of the patients before commencing any treatment. A very small percentage of the participants (7.6%; *P*-0.000) reported about having attended any workshop on

emergency training or management programs. About 94% (*P*-0.001) of the surveyed dentists were sure about handling emergency situation at their dental office, but emergency kits were available with only 24% (*P*-0.001) of the participants. Regarding the administration of injections, 34% (*P*-0.001) were confident about giving intramuscular injection and only 6.6% (*P*-0.001) were sure about giving intravenous injections. The *P* value was found to be highly significant [Table 1]. The most commonly available emergency drugs in emergency kits [Table 2] were adrenaline (88%), diazepam (85%),

**Table 1: Questionnaire and summary of the data obtained from the participants**

Question	Yes/ No	%	<i>P</i>
Do you enquire about medical history including medication and allergy?	Yes No	98% 2%	0.0001
Do you obtain filled health history proforma of the above from the patients?	Yes No	12% 88%	0.0001
Do you obtain the vital signs (blood pressure, pulse, respiration, temperature) of patients before commencing any treatment?	Yes No	38.4% 61.6%	0.0001
Have you attended any workshop on emergency training or management programs?	Yes No	7.6% 92.4%	0.0000
Do you think you can handle any emergency condition at your dental office?	Yes No	94% 6%	0.0001
Availability of emergency kits at dental office?	Yes No	24% 76%	0.0001
Can you give an intramuscular injection?	Yes No	34% 66%	0.0001
Can you give an intravenous injection	Yes No	6.6% 93.4%	0.0001

**Table 2: Availability of emergency drugs in the drug kit**

Availability of emergency drugs	Yes/No	%	<i>P</i>
Adrenaline	Yes No	90% 10%	0.739
Hydrocortisone	Yes No	55% 45%	0.398
Oral glucose	Yes No	81.4% 18.6%	0.559
Ammonia inhalant	Yes No	78.3% 21.7%	0.070
Glyceryl trinitrate	Yes No	11% 89%	0.447
Epinephrine	Yes No	71.6% 28.4%	0.285
Bronchodilator spray (salbutamol)	Yes No	7% 93%	0.674
Atropine	Yes No	53.33% 46.67%	0.853

oral glucose (81.4%), ammonia inhalant (78.3%), and epinephrine (71.6%). The less commonly available drugs in the emergency kit were hydrocortisone (55%) and atropine (53.3%). However, less than one-fourth of the participants had pocket oxygen mask (18.3%), glyceryl trinitrate (11%), bronchodilator spray salbutamol (3%), and flumazenil (2.3%).

## DISCUSSION

Fortunately, the incidence of emergency events seen in the general practice setting is less, but when an emergency does occur, it can be life threatening. The recognition of “at-risk” patients and subsequent appropriate management is paramount in reducing the probability of an adverse event. Acknowledgment that any dental patient may have a medical emergency during dental treatment is a key start point.<sup>[4]</sup>

In the present study, the main objective was to find if dentists enquire about the key start points such as medical history and drug allergy history and record the vital signs of the patients, which provide a clue for the chance of occurrence of medical emergency at the dental office. The results obtained from the present study show that 98% enquire, but only 12% get proformas filled by the patient and only 38.4% obtain the vital signs from the patient. These vital signs play a crucial role as they provide indications, such as increased temperature may be due to infection within the body, increased pulse and respiration could be due to anxiety and should be monitored side by side while the thermometer is in the patient’s mouth and mean while noticing the blood pressure, pulse, respiration, blood glucose, which only uses little additional chair time. An oral temperature in excess of 99.6°F (37.5°C) is a good indicator of the presence of a viral or bacterial infection.<sup>[5]</sup> Thus, it is mandatory to provide proformas to the patient and obtain these properly filled forms before commencement of any treatment, so that required precautions can be taken to prevent the occurrence of such emergency situations.

The evaluation of patients should include a thorough medical history and appropriate physical examination at time of admission, updating the medical histories at every appointment, and routine monitoring of vital signs prior to initiation of treatment. Consultation with appropriately trained faculty members should be sought for any patient who is deemed to be medically complex at the time of intake, and consultation with the patient’s physician should occur when indicated. Monitoring of blood glucose should be performed in patients with a history of diabetes.<sup>[1]</sup>

Gupta *et al.*<sup>[6]</sup> stated in their study that less than half (42.1%) of the dentists reported having received practical training in management of medical emergencies during their undergraduate and postgraduate education, whereas the results of our study showed that only less than one-fourth of the participants (7.6%) had attended workshops regarding this.

According to the data obtained in our study, more than half of the dentists (86%) were sure about handling any emergency condition at their dental office, of which males fared better than females, whereas the remaining had an attitude of calling ambulance in case of emergency conditions. The dentists who were not sure of handling these situations were mainly recent dental graduates who had theoretical knowledge but lacked hands-on experience and required further workshops and training programs. Most of the participants were unaware about where to go for training.

The availability of emergency kits at the dental office was at a lower level (24%), which can be attributed to the ignorance and lack of interest of dentists toward the preparedness for medical emergency. The results were almost similar to the results of a study carried out by Gbotolorun *et al.*<sup>[7]</sup> who stated that 91.1% respondents in the study had no emergency kit in their dental clinics in Lagos ( $P < 0.05$ ). However, the results were different in a study carried out by Muller *et al.*<sup>[8]</sup> who stated that 567 dentists (92%) took part in emergency training following graduation (23% participated once and 68% more than once).

Broadbent *et al.* carried out a study and found that more than half of the respondents were dissatisfied with the training they had received for medical emergencies as undergraduate students and 28 (14.1%) currently felt inadequately prepared for an emergency in practice. When asked how their preparedness could be improved, 165 (83.3%) opted for hands-on courses, 15 (7.5%) opted for lectures alone, and 5 (2.5%) opted for other courses alone.<sup>[9]</sup>

From the responses regarding the number of hours of medical emergencies’ training undertaken in the undergraduate curriculum, it is evident that there are more definitive guidelines regarding the number of hours of training recommended.<sup>[10]</sup>

Gupta *et al.*<sup>[6]</sup> found that the most commonly available emergency drugs in treatment areas were oral glucose (82.2%) and adrenaline (65.8%) and that less than one-fourth of the respondents had the

pocket mask (13.0%), bronchodilator spray (24.7%), diazepam (20.5%), and glyceryl trinitrate (17.8%). Almost similar results were obtained in our study; the most commonly available emergency drugs in emergency kits were adrenaline (88%), diazepam (85%), oral glucose (81.4%), ammonia inhalant (78.3%), and epinephrine (71.6%) and the less commonly available drugs in the emergency kit were hydrocortisone (55%) and atropine (53.3%). However, less than one-fourth of the participants had pocket oxygen mask (18.3%), glyceryl trinitrate (11%), and bronchodilator spray salbutamol (3%).

Chandrasekaran *et al.*<sup>[11]</sup> carried out a study to evaluate awareness of basic life support among medical, dental, nursing students and doctors and concluded that their knowledge was very poor and needed to be improved. Similarly, Sudeep *et al.*<sup>[12]</sup> conducted a study to evaluate the awareness of basic life support among students and teaching faculty in a dental college and concluded that their knowledge needed to be improved and updated. Thus, it is of utmost importance to conduct basic life support programs in almost all corners and sectors of our society, with the intention of creating numerous basic life support responders.<sup>[11]</sup>

A better acquaintance of medical emergencies is crucial for further expansion of dentistry in India. This will ensure better provision of and safer dental healthcare services for the population.<sup>[12]</sup>

In addition to being aware of state dental practice acts, the dentist should also be familiar with the accepted treatments and protocols for medical emergencies which often become the basis for a legal standard of care. The standard of care can be defined as “what the reasonable, prudent person with the same level of training and experience would have done in the same or similar circumstances.”<sup>[13]</sup> Failure to use the degree of care considered reasonable under the circumstances, which results in unintentional injury is negligence. For example, according to dental negligent act, if a patient is given local anesthesia without test dose and the patient develops anaphylaxis and dies, the dentist will be held liable.<sup>[14]</sup>

Illinois, a state in the USA, has become the first state to endorse a law requiring all dental offices in the state to have a written medical emergency plan in place. The law, Public Act 96-748, which was enforced from January 1, 2010, according to the Illinois State Dental Society (ISDS), has amended the Illinois Dental Practice Act by adding a section concerning

emergency medical plans and automated external defibrillators (AEDs). The ISDS offers a sample medical emergency plan to help members formulate their own plan.<sup>[15]</sup>

The extent of treatment by the dentist requires preparation, prevention and then management, as necessary. Prevention is accomplished by conducting a thorough medical history with appropriate alterations to dental treatment as required. The most important aspect of nearly all medical emergencies in the dental office is to prevent, or correct, insufficient oxygenation of the brain and heart. Therefore, the management of all medical emergencies should include ensuring that oxygenated blood is being delivered to these critical organs. This is consistent with basic cardiopulmonary resuscitation, with which the dentist must be competent. This provides the skills to manage most medical emergencies, which begin with the assessment, and if necessary the treatment of airway, breathing, and circulation (the CABs of cardiopulmonary resuscitation). Usually, only after these CABs are addressed should the dentist consider the use of emergency drugs.<sup>[16]</sup>

This suggests that although training is received in the theoretical aspect of emergencies, participants are not particularly confident to treat emergencies and may require further practical training. Effective management of an emergency situation in the dental office is ultimately the dentist's responsibility. The lack of training and inability to cope with medical emergencies can lead to tragic consequences and sometimes legal action.<sup>[2]</sup> Thus, need of the hour is framing of legislations and rules regarding the availability and time to time update of the emergency medical kits.

## CONCLUSION

The best way to handle an emergency is to be prepared in advance. Dentists, being members of the healthcare profession, should be prepared to deal with medical emergencies which may arise at their workplace. But the results of our study reflect an alarming situation about the capability of dentists to deal with such conditions. Attending continuing dental education programs consisting of workshops and hands-on courses in this field should be made mandatory.

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